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Building the awareness, competencies and skills of civil servants at the national and local levels

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Note by the Secretariat

The Secretariat has the honour to transmit to the Committee of Experts on Public Administration the paper prepared by Committee member Margaret Kobia, in consultation with Emmanuelle D'Achon, Ma Hezu, Bridget Katsriku, Lamia Moubayed, Regina Pacheco and Moni Pizani, for its consideration and action, as appropriate.

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Building the awareness, competencies and skills of civil servants at the national and local levels

Summary

Public service plays a critical role in the implementation of the 2030 Agenda for Sustainable Development. Coupled with that critical role, the rapid transformation, improvement and changes the civil service is undergoing call for civil servants to build awareness, competencies and skills needed for the future. The present paper notes some of the approaches used by countries to create awareness, while focusing on the specific operational and policy level skills that civil servants in both national and local governments may require to contribute most effectively to the attainment of the Sustainable Development Goals.

Globally, the distribution of information on the 2030 Agenda remains asymmetric between and within regions, across populations and between and within countries, which adversely impacts the level of mobilization by State and non-State actors and their ability to make progress in implementation of the Goals.

The paper also outlines some emerging technologies and applications with implications for public policy that can be expected to change the ways in which public services are delivered. It assesses the anticipated impacts of the technologies on the demand and supply of future skills and competencies, as well as public service delivery effectiveness and efficiency in implementation of the Goals.

The paper observes that the availability of core skills and competencies in the civil service will be a major determinant of the trajectory that countries take in the attainment of the Sustainable Development Goals. Without adequate investment in the accumulation of the requisite stock of skills in the less developed countries, the results for the Sustainable Development Goals may not be much different from those of the Millennium Development Goals. The economic situation in the least developed countries can be seen to be both a result of and a factor for low skill and competency accumulation.

The author concludes that persistent development gaps among countries can be attributed, to an important degree, to the level of government commitment to public policy prioritization for human capital development, premised on investments in new skills, competencies and technologies. For the least developed countries in particular there is potential for benefiting from leapfrogging, provided there are increased budgets for the development of skills and competencies and investment in new technologies.

I. The skills and competencies imperative in the civil service

1. An often overlooked proposition is that the capacity and capabilities of the government workforce can fundamentally determine the degree of success of all public programmes and policy reforms. The demand for qualified public servants to carry out the essential functions of government is apparent in all areas of administration.

2. Civil servants are critical to the operations of government. At the policy level, they interpret and translate the political agenda into actionable policy. They also translate policy into programmes and specific activities to which budgets can be allocated. Available skills and competencies determine how effectively broad policy objectives are translated into measurable targets.

3. At the technical level, civil servants are responsible for implementing development programmes, monitoring progress, undertaking evaluations on results and impacts, reporting and providing feedback that informs policy decisions on the trajectory that programmes should take. The evidence gathered from evaluations provides information on cost-effectiveness, cost versus benefits, cost-efficiency, value for money and impacts that would inform decisions for scaling or reallocation of resources to alternative interventions. Civil services everywhere must also contend with finding ways to improve productivity and enhance collaboration to overcome administrative silos.

4. Nevertheless, in many countries the public sector has difficulty attracting the critical skills that are needed, for a myriad of reasons, such as outdated civil service norms and structures that can hinder recruitment and skills development, or conditions of employment that in some countries may make it hard for the civil service to compete with the private sector labour market.

5. Many governments, especially in the middle and low-income countries, struggle with mobilizing sufficient revenues to increase public sector wages. There is a continuing shortage of public resources in some countries, which is leading to a rethinking of service delivery modalities, the ways organizations function and the degree of efficiency of the whole system. Organizations are preoccupied with the lack of material and financial resources and with the need to ensure the availability of those resources. Civil servants in most countries are expected to deliver results in the face of major resource constraints.

6. In its resolution 72/235 of 20 December 2017 on human resources development, the General Assembly recognized that the future of work, impacted by progress in science and technology, requires adaptability and faster learning of new skills, which, in turn require a shift towards early childhood education, lifelong learning and a comprehensive life-cycle approach to education and training, enabled, inter alia, through increased investment in teacher training and improved access to digital learning resources, especially in developing countries. The Assembly also encouraged Member States to adopt and implement comprehensive human resources development strategies premised on national development objectives that ensure a strong link between quality education, training and employment, help to maintain a productive and competitive workforce and are responsive to the needs of the economy.

7. Shortages of human resources in the public sector can be especially acute in the least developed countries, where the pool of skilled professionals in the wider population tends to be more limited and governments may be too constrained financially to substantially expand the requisite education and training. Public sector training budgets can themselves be an easy target for cuts in times of reduced

expenditure, which can have a significant impact on civil service capabilities, particularly in low-income countries.

8. In some countries, the civil service has struggled with questions of morale and motivation for extended periods. In countries where the problem is most pronounced, governments remain too financially constrained to give the issue sufficient attention. Low morale can be exacerbated by growing pressure from citizens on service quality, combined in some cases with public perceptions of inefficiency or outmoded government operations.

9. Several empirical studies have shown, in addition, that public management reforms, with changes to regulations, structures and processes, do not always produce the expected results or may have unintended consequences. For example, there may be instances in which public administrations have adopted tools and ideas for reform from the private sector or from other Governments, such as performance-related pay, without fully taking into account the national context or considering the limits and weaknesses of these approaches.[1]

10. The promotion of political interests in public administration can add another layer of complexity. It can occur, for example, that political actors announce policy objectives without allowing time for a robust analysis of potential impacts. To ensure progress on implementation of the Sustainable Development Goals in the face of sometimes competing interests, political will at the highest level of Government remains essential. This may be all the more important in countries affected by conflict, as peace and collaboration are enabling conditions of civil service effectiveness.

11. It is against this backdrop of needs and challenges that building the competencies and skills of civil servants for implementation of the 2030 Agenda for Sustainable Development takes place. The present paper explores some of the specific issues faced by the public sector in human resources management and proposes a framework of skills and competencies that, going forward, may be of benefit to the civil service in leading implementation of the Sustainable Development Goals.

II. Building civil service awareness of the Sustainable Development Goals

12. Awareness is the entry point to building momentum for cross-sectoral action on the Sustainable Development Goals in national and subnational contexts. Knowledge and understanding of the 2030 Agenda enables the civil service to establish pathways to achievement of targets. Policy level awareness in the civil service increases the chances that centres of Government will assign priority to the integration of the Goals into national development plans and allocate sufficient resources for implementation of the related programmes.

13. At the United Nations high-level political forum on sustainable development, countries have reported a variety of approaches to increase national ownership and awareness of the 2030 Agenda, including on the part of civil servants. They include such awareness-raising events as workshops, meetings and conferences on the Sustainable Development Goals, briefings to cabinet, meetings in parliament, wide-scale communication and advocacy efforts, dialogue with stakeholders, radio and television discussions, and communication strategies designed to make the Goals

[1] See, for example, James L. Perry, Trent A. Engbers and So Yun Jun, "Back to the future? performance-related pay, empirical research, and the perils of persistence", *Public Administration Review*, No. 69 (January–February 2009).

more understandable to the general public, as well as web-based platforms to engage civil society in follow-up and review. Other awareness-raising approaches reported are, among others, the inclusion of youth in programmes, outreach events such as awards, contests and festivals, and the integration of the Goals into curricula and educational programmes.[2]

14. Mexico and Sierra Leone, for example, have reported including the Sustainable Development Goals in activities and speeches of high-level officials to increase awareness. In Germany and France, people have been engaged through Internet-based platforms that allow various interest groups to present their points of view. Egypt has created short films about the country's national sustainable development strategy and provides a dedicated website as well as social media coverage of the Goals.

15. Kenya has reported the production and dissemination of information, education and communication materials. Various departments and agencies use social media to disseminate to the public messages relating to the Goals. Sensitization forums involving different stakeholder groups have been held. The coalition of civil society on the Sustainable Development Goals, in collaboration with the Government, has also been undertaking community outreach programmes.

16. Egypt has also employed a company to consult with various stakeholder groups, which reportedly built trust and encouraged interested parties to participate actively in negotiations and debate. Sierra Leone has produced a simplified version of the 2030 Agenda which was distributed to Parliament and the general public and used in television and radio programmes. Mexico, too, produced a brochure about the Goals in simplified language. In the preparation of its national implementation plan, Finland organized a regional tour to disseminate information on the 2030 Agenda, in cooperation with cities, municipalities, non-governmental organizations and signatories of the regional operational commitments to sustainable development. The Philippines has used radio appearances and attendance at special events for that purpose.

17. Estonia, Finland and Norway are among the countries that have included topics related to sustainable development and the 2030 Agenda in school and university curricula and in teaching materials. The Republic of Korea has also encouraged the inclusion of content on the Sustainable Development Goals in textbooks for primary and secondary school students.

18. In countries pursuing decentralization and more devolved systems of Government, the role of the local political leadership comes into focus. Awareness of the Sustainable Development Goals is crucial at the local level, given the proximity of local authorities to the people and, at the grass-roots level, their role in delivering basic public services and their ability to take integrated approaches.

III. Strategic human resources management in the context of the Sustainable Development Goals

19. Given the wide scope of the Sustainable Development Goals, it is apparent that to achieve results on many fronts, civil servants will need to acquire new skills and competencies. Governments, which have the central role in implementation of the

[2] See United Nations, Department of Economic and Social Affairs, "2016 synthesis of voluntary national reviews" and "2017 synthesis of voluntary national reviews", presented at the high-level political forums on sustainable development in 2016 and 2017, respectively. Available from https://sustainabledevelopment.un.org/content/documents/23862016_VNR_Synthesis_Report.pdf and https://sustainabledevelopment.un.org/content/documents/17109Synthesis_Report_VNRs_2017.pdf.

Goals, may need to make urgent investments in retooling public services and equipping civil servants with new knowledge, skills and competencies. Governments may find it beneficial to prioritize the following approaches, strategies and investments to build the requisite skill sets and competencies of civil servants involved in implementation of the Goals.[3]

Determining skills and competency gaps

20. Assessing skill gaps in the current workforce is a fundamental first step in strategic workforce planning. It can be a complex task. Even for high-income countries that have defined common skills and competency profiles for civil servants, the mapping of skills and identification of gaps remains a challenge.

21. Similarly, future-oriented workforce planning remains a central challenge for public sector human resources management. Civil service workforce planning, driven by skill and competency requirements rather than numbers and costs, is essential to ensure that both capacity and capability considerations are factored into plans for implementation of the Sustainable Development Goals. To assess changes in the skills needed in today's civil services, countries may need to develop frameworks that identify main functional areas and the specific tasks and skills within those areas that are central to the relationship between civil servants and society.

22. To determine skill and competency gaps, there may be a need to develop reliable data on workforce skill sets, which are rarely available in the public sector, as well as foresight capacity in civil service planning. Better data and analytical tools together can help to maintain a government workforce that is able to keep pace with social, technological and other changes.

Attracting and selecting employees with the right skills and competencies

23. In addition to training, plans to fill identified gaps usually involve workforce development through the recruitment of new employees. Many countries implemented hiring freezes following the 2008 financial crisis. Even as economies recover and civil services face high levels of retirement, many budgetary constraints remain, which suggests a need to ensure that hiring is undertaken with careful attention to expanding access to skills that can boost public sector capacity and productivity, and that civil services and public administrations are able to attract people with those skill sets to the workplace.

24. Strengthening of merit-based recruitment processes are generally viewed as an important strategy in the ongoing professionalization of civil services. The strategy may need to be balanced, however, with the need to open up possibilities for recruitment at all levels, quicken the speed of the process and ensure that selection is consistent with future-oriented skills and promotion of public sector workforce diversity. If specific skill sets are lacking, fast-track programmes are one way to reach out to people with those skills. Some governments are adopting competency-based requirements in addition to professional and educational qualifications as indicators of merit.

[3] See Organization for Economic Cooperation and Development (OECD), *Skills for a High Performing Civil Service*, OECD Public Governance Reviews (Paris, OECD Publishing, 2017); United Kingdom, House of Commons Public Administration and Constitutional Affairs Committee (PACAC), "Developing civil service skills: a unified approach: Government response to the Public Administration Select Committee's Fourth Report of Session 2014–15" (HC 526) (London, The Stationery Office, 2015).

Developing and nurturing talent

25. Employee development should be a pillar of any well-designed skills management strategy, particularly in civil services with high levels of job security and low overall turnover. Ensuring a learning culture is even more important given the high rate of change, technological advancement and service delivery complexities that come with the Sustainable Development Goals and associated targets. Lifelong learning should be seen as essential both for career development and as an organizational strategy to modernize and respond to national and local sustainable development objectives.

26. In addition, civil services can showcase eventual learning opportunities as part of branding strategies that portray government agencies as employers of choice. This way, the public sector gets to attract talent that it has struggled to engage yet is critical to the implementation of the Sustainable Development Goals.

Utilization of the skill and competency stock

27. Recruiting new talent and developing the skills and competencies are necessary but insufficient to strengthen the competency stock of the civil service. Once skills are identified, acquired and developed, they must also be deployed in a system designed to make use of them. In regard to the factors most affecting performance, the evidence suggests that employees need abilities, motivation and opportunity to perform well.

Establishing and strengthening civil service management development capacity

28. Different institutional structures exist to manage and oversee civil service training, and various approaches exist to align training at individual, organizational and civil service levels to the core priorities of the civil service, ideally to the civil service vision and competency frameworks, and to future skills development priorities in areas such as foresight, innovation and technology. Countries that combine individual learning incentives, such as learning plans linked to performance management processes, with organizational or civil service-wide plans are more likely to be able to ensure that civil servants receive the training they need, resources permitting, and that training programmes are effectively coordinated.

29. Promoting a culture of learning in the public sector also calls for attention to the use of a broad range of tools, such as mentoring, coaching, networking, peer learning and mobility assignments to promote learning as a day-to-day activity that is integrated into the job functions of civil servants. Leadership development and online training tools are proving helpful in the civil services of developed countries and may have potential for adoption and adaptation in developing countries as well.

Budget prioritization for civil service capacity and capability development

30. In some countries, training budgets were one of the first things to be cut following the 2008 financial crisis. While the need for budgetary austerity was understood at the time, such a strategy, if continued over the long term, risks cutting off the ability of the civil service to renew the skill sets needed to make good policy and implement new services. Investing in civil service learning requires training programmes, as well as embedding learning in the culture and values of the organization, while making staff development a core responsibility of every public manager.

IV. Skills and competencies essential for implementation of the Sustainable Development Goals

31. Agencies responsible for policy formulation, programme design and implementation of the Sustainable Development Goals may require both a consolidation of existing skill and competency sets and a completely new set of skills and competencies. The 11 skill and competency areas that are presented below may be particularly relevant.[4]

Baseline analytic and monitoring capability

32. Implementation of programmes aimed at the attainment of the Sustainable Development Goals, whether undertaken by government alone or jointly with development partners, calls for continued investment in the capacity of civil servants to conduct baseline analyses, based for example on econometrics, big data and predictive analytics, and to monitor progress towards the targets.

33. There are two key stages in the public policy cycle at which empirical analysis could be most valuable. The first involves the design of public policy. At this stage, civil servants should have technical grounding in conducting literature reviews in the relevant policy domain, evaluating evidence of the effectiveness of various approaches and assessing possible interventions, including propositions for innovations and trials in new areas. The second involves monitoring and evaluation in which rigorous monitoring, measurement and analysis at both the programme and component levels is carried out. At this stage, civil servants should have experience in monitoring and evaluation, underpinned by the ability to design and use systems for capturing relevant high-quality data.

Programme prototyping

34. Many countries continue to face fiscal constraints, the need for shorter policy cycles and a demand for citizen participation in decision-making processes. Depending on the sectors responsible for the implementation of programmes for specific Sustainable Development Goal targets, civil servants will require skills in designing strategic experiments (programme pilots) in which the critical elements of a given intervention are introduced on a limited basis to test key assumptions, measure performance and capture design refinements.

35. The use of prototypes in Sustainable Development Goal-related programming provides an opportunity to generate evidence to inform programme design while verifying assumptions made, before limited public resources are deployed for full-scale interventions. Effective programme prototyping makes it possible to make critical adjustments to initial designs that may have been produced following a results-chain methodology. Ultimately, strengthening prototyping skills among civil servants may be one of the most cost-effective approaches to enhancing capacity to address sustainable development objectives.

Futuristic design integration

36. Noting the longer-term orientation of sustainable development to the year 2030 and beyond, there is a need to establish the capacity in government departments and agencies to anticipate future scenarios with a view to adopting strategies that are

[4] See Bob Willen, and others, "Proactive governance: policy and strategy design in the context of accelerating change"(World Government Summit and A.T. Kearney Global Business Policy Council). Available from https://www.worldgovernmentsummit.org/api/publications/document?id=e96e7dc4-e97c-6578-b2f8-ff0000a7ddb6.

aligned with people's needs and aspirations. For this to happen, civil servants should possess the technical capacity to define and test programme requirements against the range of future conditions that the initiatives envisaged are most likely to face, then design strategies to achieve national and local sustainable development priorities accordingly. Futuristic design can be both a powerful means of driving policy innovation at the outset of a policy formulation process and a key part of strategic due diligence by which the future resilience of strategies for attaining national Sustainable Development Goal targets is tested and refined before implementation.

Simulation and harnessing interactive dynamics

37. Recognizing that the implementation of programmes for the attainment of the Sustainable Development Goals may take place amid many competing interests and a proliferation of powerful State and non-State actors, civil servants may find it helpful to undertake rigorous interactive analysis to enhance programme effectiveness. Such analysis makes it possible to model and systematically simulate the likely responses of key stakeholders, adversaries, allies and other players to a given development policy or strategy.

38. By acquiring new skills in interactive analysis, civil servants establish the much-needed technical preparation to build anticipatory resilience. Simulation capabilities may also make it possible for core implementation staff to anticipate possible reactions to initiatives, policies, programmes or strategies and to refine approaches in ways that increase the chances of success in the timely achievement of the Sustainable Development Goal targets.

Full-spectrum policy innovation

39. By establishing the capacity of government officials to foster innovation, State and non-State actors will be addressing arguably one of the foremost strategic challenges of this and the next generation. Providing an enabling environment for innovation does not necessarily require a large bureaucracy. Rather, it requires public officials with the ability to assess relevant established innovations and take part in critical networks to independently drive collaboration that promises the most contextually relevant innovations for the attainment of the Sustainable Development Goals.

40. Public servants should also be encouraged to participate in the global policy innovation networks which have, as their key nodes, a growing number of graduate schools of advanced public policy studies, a range of global policy think-tanks and an increasing number of government-led centres of innovation. By actively engaging their policymakers in these networks, government institutions can maximize their ability to see emerging best practices early in their evolution and adapt them for their 2030 Agenda initiatives.

Comprehensive stakeholder engagement

41. The engagement of partners and stakeholders in government-led initiatives is consistent with target 16.7 of Goal 16 which aims to ensure responsive, inclusive, participatory and representative decision-making at all levels. At the formative level, the process requires that civil servants have functional skills in stakeholder engagement, negotiation and collaboration. This set of skills is important for the civil servants at the core of the design and implementation of sustainable development programmes, since stakeholders offer a potentially valuable repository of knowledge that may not otherwise be readily accessible.

42. Another important consideration for the acquisition of engagement skills by civil servants is the fact that stakeholder support for initiatives under the Sustainable

Development Goals is not a given. Stakeholders may wield considerable influence in an organization or within the community in which they operate to the extent that they can engender or directly mount resistance, for example when an initiative is seen to be exclusively externally driven. However, the ability of government officials involved in development programmes to elicit stakeholder participation increases the chances that stakeholders will support high-priority initiatives and make a direct contribution to their success. An important disconnect can occur between policymakers and implementing agencies if programmes are designed with limited input from target beneficiaries.

Expert crowd-sourcing

43. The emerging technical complexity and multidisciplinary nature of policy and strategy design under the 2030 Agenda is creating unprecedented skill and competency requirements for government. The first implication of this is that policymakers responsible for the implementation of the Sustainable Development Goals require robust capabilities for identifying and retaining subject matter experts.

44. Using crowdsourcing techniques, government officials overseeing sustainable development policy should be able to identify ideas based on a wide range of knowledge and experience. In addition, rather than have policy advisers look at ideas and pick the best solution, governments could provide mechanisms for stakeholders to propose innovative ideas for implementing Sustainable Development Goal programmes, and use the wisdom of the crowd to inform decisions on what goes forward.

45. Such a change in decision-making processes could challenge conventional management approaches and shift power from public policymakers to other stakeholders. Thus, the use of crowdsourcing in policymaking could be expected to meet resistance. A critical question is whether civil service leaders would be willing to give more say to line staff and other stakeholders. Overcoming such resistance could take a long time in many public sector organizations, while in others a transformation is already underway that could accelerate efforts to meet the Sustainable Development Goal targets, inter alia, using more cost-effective approaches that may otherwise not have been considered.

Whole-of-government alignment analysis

46. The ability of civil servants to undertake a whole-of-government alignment analysis helps to maximize the concentration of efforts behind programmes geared towards the Sustainable Development Goals. The starting point for this kind of analysis is the systematic assessment of the relationships between programme strategies and the policies, strategies and capabilities of other internal and external governmental entities.

47. In 2030 Agenda programming, such an analysis entails the identification of all relevant linked units, ministries, local governments and other potential partners and the detailed analysis of the potential linkages to them. If civil servants are equipped with the skills to undertake whole-of-government alignment analysis in the course of the programme design, departments, units or agencies will be able to ensure and maximize the alignment of the Sustainable Development Goal programmes and strategies with national development priorities.

Agile resource management

48. Governments often implement programmes against a backdrop of competing demands on national resources and budgets. The design and implementation of such programmes should be based on efficient solutions with convincing business cases,

especially when the public resources required will exceed those initially planned for national development priorities. As a result, civil servants responsible for the design and coordination of programmes under the Sustainable Development Goals will require public resource management skills.

49. Effective resource management requires civil servants to be able to mobilize resources from the private sector and other development partners to help meet funding gaps. Through effective engagement with the private sector in the form of public-private partnerships, governments can benefit from long-term value-for-money projects with appropriate risk allocation between the private and public sectors, which is especially important for initiatives requiring large investments or advanced technologies.

New approaches to governance and accountability

50. Government accountability is a legitimate expectation of citizens everywhere. Target 16.6 of Sustainable Development Goal 16, which calls for the development of effective, accountable and transparent institutions at all levels, suggests a need for government officials to understand the logic of checks and balances and the ways to embed accountability mechanisms in public policy from the policy design stage. Governance and accountability have both a corrective function (addressing policy grievances and adjusting a variety of policy aspects) and a preventive function (reducing public sector dysfunctionality arising from corruption, inefficiency and waste).

51. By instituting next-generation governance and accountability, policymakers at the centre of sustainable development programmes may be able to go beyond the traditional yet essential lines of accountability regarding service delivery, budget management, decision authorities and performance objectives to a deeper set of arrangements. The approach entails the concept of shared responsibility between the government and the wider stakeholder community, which may include international institutions, the private sector and civil society, and gives a voice to the public, which represents the broad interests of society.

Outcome monitoring and measurement

52. Integrated outcome monitoring and measurement constitutes a central pillar of effective programme design under the Sustainable Development Goals. The capacity of State officials responsible for coordination and implementation of the 2030 Agenda in evaluative monitoring and measurement is a fundamental requirement for both prototypes and fully-scaled programmes. Equipped with such technical capacity, key programme staff will be able to provide the all crucial data and evidence that form the basis for iterative improvement of the programmes over which they preside.

53. Adaptive design changes in sustainable development should be based on continuous monitoring of programme impact that allows policymakers to trace the effects of policy at any given time and fine-tune it based on the inputs obtained in the monitoring process. For this approach to work, however, monitoring and measurement systems and the mechanisms of continuous refinement must be built into the programme design and agreed upon by key stakeholders at the outset.

Addressing the needs of countries in special situations

54. The least developed, landlocked and small island developing States and conflict-affected countries may face particular challenges in building the civil service skills and competencies needed for the 2030 Agenda. The United Nations Institute for Training and Research (UNITAR) has identified four priority training tasks to help countries in special situations to reach the Sustainable Development Goals by 2030.

The first is to strengthen the capacity of policy officials at the national and subnational levels in order to incorporate the Goals into national planning frameworks and effectively harmonize those plans with multiple national, regional and international agreements. The second is to help officials in planning and line ministries to understand the interlinkages among the Goals and targets and quantify the benefits and impacts of policy options. The third is to build the capacity for modern data gathering and data analysis, including through better household surveys, improved censuses and strengthened data collection and use. The fourth is to help to build the capacity of non-governmental actors to strengthen their engagement in the implementation of the Goals and other major commitments.[5]

V. Reflections on emerging technologies

A. Technologies and service delivery approaches

55. For countries to remain competitive, the skills and competency profiles of civil servants may have to keep pace with advances in technology and new approaches to public service delivery. The present section reviews some of the technologies that are either already impacting how public services are delivered or that have shown great potential. It is noteworthy that, for emerging technologies and scientific applications to be of value to the public sector, governments must be prepared by way of new policies for uptake, implementation capacity and regulation.

56. Beyond the current thinking on the spectrum of skills and competencies for civil servants to support the effective implementation of sustainable development programmes and increase the likelihood of attaining the targets, it will be important for governments to focus on a number of applied technology advances. Such technologies hold great promise for improving service delivery and the client experience both in the public and private sectors. They include: robotics and artificial intelligence; genomic medicine; biometrics; data science; nanotechnology; three-dimensional printing; the Internet of things; nudging and behavioural insights; and the convergence of technologies in smart cities.

Robotics and artificial intelligence: efficiency and precision benefits

57. Robots and artificial intelligence can automate and enhance work traditionally done by humans. Often the technologies operate together, with artificial intelligence providing the robot with instructions for what to do. Driverless cars are a much cited example. The subject is of critical importance for governments that are keen on investing in efficiency improvements. For example, governments can emulate online video services by using artificial intelligence to personalize the transactional services they provide to citizens, while crime-prediction algorithms are allowing police to take precautionary measures before crimes occur.

Genomic medicine and personalization of medical care

58. Genomic medicine uses an individual's genome, their unique set of genes and DNA, to personalize their healthcare treatment. On the basis of genomic medicine, rare disorders caused by mutations in single genes are already being treated through gene editing. In time, such disorders may be eradicated altogether. For common diseases, such as cancer, patients' genomic data could lead to more sophisticated preventative measures, better detection and personalized treatments. Researchers are

[5] For additional information, see UNITAR, "Training needs to reach the SDGs by 2030", 6 September 2017. Available from https://www.unitar.org/training-needs-reach-sdgs-2030.

exploring whether gene editing could make animal organs suitable for human transplant, and whether gene drives in mosquito populations could help to eradicate malaria.

Biometrics to map citizens and improve services

59. Biometrics rely on unique physical and behavioural traits, such as a fingerprint, iris or signature. Unique to every person and collectable through scanning technologies, biometrics provide every person with a unique form of identification which can be used for many applications, from authorizing mobile phone bank payments to quickly locating medical records after an accident or during an emergency.

60. From a large-scale national identification initiative in India to border control initiatives in Singapore, the United States of America and the Netherlands, biometrics are already being used in a wide range of government services. They are improving the targeting of welfare payments; helping to cut absenteeism among government workers; and improving national security. However, their use raises challenges that Governments need to manage, such as privacy issues; the risk of mission creep when extra and often unnecessary details are added to a project, usually causing the project to spiral out of control; data security; public trust; and the financial sustainability of new technology systems. Governments should work towards the twin objectives of utilizing the benefits of biometric tools and managing the risks.[6]

Data science and the future of public policy

61. Using data to make decisions is not new. However, the proliferation of Internet and mobile technologies has produced data at an unprecedented rate. The data science revolution has caused many industries to reconsider their strategies and introduce new ways of expanding business. Modern analytics has made its way into such fields of endeavour as public health, policing, economics and sports, among others.[7] Data science tools, such as real-time data, data visualization and machine learning, are bringing new ideas and approaches to policymaking. Used together with behavioural approaches, they could revolutionize the way development policies and programmes in the least developed countries are designed across most of the 169 targets.

62. The rates of uptake of data science differ, however, between the private sector and public organizations. The difference is primarily a result of the way data science is used: on the one hand, the for-profit private sector often aims at improving efficiencies, improving client experience, enhancing productivity and ultimately at lowering costs and increasing profits; on the other hand, the motivation for uptake in the public sector, especially in developing countries, is often based on the priorities of the political leadership of the day or at times is simply a borrowed good practice.

Internet of things

63. The "Internet of things" refers to a network in which applications and services are driven by data collected from devices that sense and interface with the physical world. Important Internet-of-things applications are relevant to many economic sectors, including health, education, agriculture, transportation, manufacturing and

[6] See The Economist Intelligence Unit, "Advanced science and the future of government" (World Government Summit, 2016). Available from https://www.worldgovernmentsummit.org/api/publications/document/fae769c4-e97c-6578-b2f8-ff0000a7ddb6.

[7] Ibid.

electric grids.[8] Fully functional and globalized Internet-of-things technologies could proffer economic and convenience benefits that span the domain of most if not all of the 17 Sustainable Development Goals.

64. The Internet of things can also empower people in ways that would otherwise not be possible, for example, by enabling cost-effective delivery of critical health care supplies to hard-to-reach segments of the population that may otherwise be left behind owing to remoteness and marginalization. The countries that anticipate the challenges while fostering greater use will be best placed to seize the benefits.

Three-dimensional printing

65. The use of three-dimensional printing in producing components one layer at a time allows for more intricate design, as well as reducing waste. Governments are starting to use the technology to print public infrastructure, such as the new footbridge in Amsterdam, designed by a Netherlands company.[9] When supported by government policy, the expansion of three-dimensional printing technologies to the mass market in the construction industry holds promise in advancing both Goal 9 on building resilient infrastructure and Goal 11 on making cities and human settlements inclusive, safe, resilient and sustainable. With three-dimensional printing, infrastructural resilience is easier to achieve since designs for integrated infrastructure can be pre-programmed to embody requirements for future expansion and improvements.

Nanotechnology

66. Another technology relevant to Goal 3 efforts to ensure healthy lives and promote well-being for all at all ages is nanotechnology. It involves the manipulation of individual atoms and molecules on a tiny scale; one billionth of a metre. Nanoscale drug delivery could target cancer cells with new levels of accuracy, signalling a major advance in healthcare quality. Brain-mapping programmes could allow mankind to finally understand the inner workings of the human brain and usher in revolutionary treatments for such conditions as Alzheimer's disease and depression.

Nudging and application of behavioural insights to policymaking

67. Drawing on behavioural economics and social psychology, nudge theory can help to explain how economic decisions are influenced by cognitive biases.[10] Faced with tight fiscal situations, policymakers worldwide have been excited by the potential of nudges; small, low-cost changes that could make a big difference in the effectiveness of government interventions. As a result, nudge units can be found in a number of governments.[11]

68. Considering the outcomes already documented on small, low-cost changes that significantly enhance the effectiveness of government interventions, it can be

[8] OECD, Working Party on Communication Infrastructures and Services Policy, "The Internet of Things: seizing the benefits and addressing the challenges", document DSTI/ICCP/CISP(2015)3/FINAL. Available from http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/CISP(2015)3/FINAL&docLanguage=En.

[9] See The Economist Intelligence Unit, "Advanced science and the future of government" (World Government Summit, 2016). Available from https://www.worldgovernmentsummit.org/api/publications/document/fae769c4-c97c-6578-b2f8-ff0000a7ddb6.

[10] See Kok Ping Soon, "Nudges: Why, How and What Next?", *Ethos*, Issue 17 (June 2017). Available from https://www.csc.gov.sg/docs/default-source/ethos/ethos17.pdf.

[11] See Owain Service, Kok Ping Soon and Elspeth Kirkman, "Government Policy and Practice Through the Behavioural Insights Lens", a presentation by Behavioural Insights Ltd at the Behavioural Exchange Conference, Harvard Business School, Cambridge, Massachusetts, 6-7 June 2016. Available from https://www.youtube.com/watch?v=-tqeqj_G2L4&feature=youtu.be.

deduced that behavioural insights are relevant to public policy in both developing and developed countries on a number of grounds. First, governments everywhere are faced with rising and more divergent expectations for better public services. Second, the operating environment for the public service is getting ever more complex. Third, governments are faced with tightening resource constraints. Set against rising public expectations, a more complex operating environment and diverse populace and increasingly tight fiscal and manpower situations, implementers of government programmes on the Sustainable Development Goals will most likely be persuaded to adopt nudging by integrating behavioural insights in development programmes.

Converging technologies and smart cities

69. A smart city denotes an instrumented, interconnected and intelligent city. Instrumentation enables the capture and integration of live real-world data through the use of sensors, kiosks, meters, personal devices, appliances, cameras, smart phones, implanted medical devices, the web and other similar data-acquisition systems, including social networks as networks of human sensors. Interconnection supports the integration of data into an enterprise computing platform and the communication of information among the various city services. Intelligence, in contrast, arises from the inclusion of complex analytics, modelling, optimization and visualization in the operational business processes to make better operational decisions.[12] Technology integration in smart cities supports Goal 11 targets for inclusive, resilient and sustainable cities and human settlements.

B. Capacity and policy implications of new technologies, and service delivery approaches for governments

70. The proliferation of new technologies and service delivery approaches and the evidence from the private sector on service delivery improvements underscore the potential these new technologies hold for the public sector, accompanied by appropriate regulatory policies. Such policies will be instrumental in guiding governments on the selection of best alternatives, minimizing the adverse effects of new technologies and building of the most productive coalitions for results.

71. For the least developed countries, the quest for new technologies and approaches to service delivery will have to be preceded by systematic mapping of possible areas of highest impact in technology-based service delivery, assessment of skill and competency requirements of the civil service and a mapping of infrastructure needs for anchoring uptake. Such pre-uptake assessment increases the chances that governments, which have historically lagged behind in the integration of new technologies into their service delivery matrix, would get the best mix of skilled personnel and infrastructure that are responsive to context.

72. To establish internal capacity for the uptake and implementation of new technologies and service delivery approaches, governments will need to renew the focus on the acquisition of the requisite knowledge and skills for the new technologies and applications both at the policy and operational levels. In addition to the skill dimensions to public service capacity-development for new technologies, governments, especially in the developing countries, would need to incentivize private sector participation in both the production of skills and the investments in

[12] C. Harrison, and others, "Foundations for smarter cities", *IBM Journal of Research and Development*, vol. 54, No. 4 (July/August 2010). Available from http://fumblog.um.ac.ir/gallery/902/Foundations%20for%20Smarter%20Cities.pdf.

infrastructure that support new service delivery channels on the basis of the new technologies.

73. In many instances, skilled labour in the new technologies, with the potential for a revolution in service delivery in the public service, comes at a premium. To establish the required pool of skills for the integration and use of new technologies and applications in the delivery of public services, most developing country governments will need to recalibrate their recruitment approaches and employment terms to attract and retain the new calibre of employee. New government policies on education, training and capacity-development could also deliberately target scholarships and conditional funding programmes for training in the nexus between development, new technologies and public policy. In addition, public services could simultaneously prioritize investments in requisite infrastructure to support the rollout of new technologies in service delivery. A starting point in the development of infrastructure is the institutionalization of public-private partnerships that could significantly cut the concentration of public resources on infrastructure, thus potentially enabling governments to reallocate resources to other equally productive sectors of their economies that are supportive of the Sustainable Development Goals.

VI. Proposed frameworks for competencies and skills

Competency framework for civil servants

74. A competency framework that can be proposed for senior civil servants consists of six core competencies and 53 behavioural indicators which can be used to assess performance. The senior civil servant competency framework is based entirely on behaviours. The six competencies, considered to be critical for the effective performance of all civil servants at the managerial and policy levels, are as follows: thinking strategically, getting the best from people, learning and improving, focusing on delivery, giving purpose and direction and making a personal impact.[13]

75. Each of the competencies has a list of effective behaviours, which are the criteria used in assessing performance. This framework is deemed organizationally neutral and can be applied to and used to evaluate and develop persons in top management positions in private or public organizations.[14]

76. A core attribute of strategic thinking, for example, is the capacity to be sensitive to wider political and organizational priorities. Civil servants with competencies in learning for improvement will exhibit the ability to apply learning from their experiences while building productive relationships with people across and outside the organization. To get the best from employees, civil service leaders should be capable of adapting their leadership style to different people, cultures and situations.

77. Civil service leaders with competencies that focus on delivery are those who can organize work to be delivered to time, budget and agreed quality standards. To be competent in giving purpose and direction, top level civil servants should be clear on what needs to be achieved and exhibit a participatory character by involving their staff in deciding what has to be done. For personal impact, leaders should be visible and approachable to all, and act with honesty and integrity.

[13] See Sylvia Horton, "Competency management in the British Central Government", KU Leuven Public Management Institute (2010). Available from https://soc.kuleuven.be/io/onderzoek/project/files/hrm27-country-report-uk.pdf.

[14] See Sylvia Horton, "The competency movement", in Sylvia Horton, Annie Hondeghem and David Farnham (Amsterdam, IOS Press, and Brussels, International Institute of Administrative Sciences, 2002).

Skills framework for civil servants

78. The professional skills framework for civil service is a structured way of thinking about jobs and careers for civil servants at all grades. As depicted in the figure, it sets out the skills they need to do their job well as members of the civil service, irrespective of their grade they are or the place where they work. In many countries, the civil service is a diverse organization and the range of skills required should reflect that diversity.[15]

79. Civil service leadership qualities are at the centre of the framework. They are as follows: to provide direction for the organization, to deliver results, to build capacity for the organization to address current and future challenges and to act with integrity. In addition, every civil servant needs certain core skills to work effectively. The four core skills in the framework are: people management, financial management, analysis and use of evidence, and programme and project management. In addition to those skills, persons in or aspiring to the senior civil service leadership need to demonstrate skills in communications and marketing and in strategic thinking.

Figure
Skills framework for civil servants

VII. Conclusions and recommendations

80. Notwithstanding the evidence of the increasing levels of awareness of the 2030 Agenda within government and the public sector, evidence from the high-level political forum voluntary national reviews points to an asymmetric distribution of information on the Sustainable Development Goals in government and society at large. Approximately two years after the adoption of the Goals, major information gaps persist within and between countries and regions at a level that impedes mobilization, networking and collaboration for action. The information gaps suggest

[15] See Sylvia Horton, "Competency management in the British Central Government", KU Leuven Public Management Institute (2010). Available from https://soc.kuleuven.be/io/onderzoek/project/files/hrm27-country-report-uk.pdf.

the need for greater country-level advocacy to raise awareness across different stakeholder groups in support of joint action towards the achievement of the targets.

81. Disparities in skill and competency concentration between the predominantly developed and low-income countries can in part be explained by variations in national priorities. While developed countries have made investments in both traditional and emerging skills for civil servants that would profoundly impact public policy for sustainable development, their counterparts in developing countries often lag behind. Left uncorrected, the skill and competency gap in developing countries will ultimately result in a commensurate lag in their attainment of the Sustainable Development Goal targets. Efforts at improving the capacity of developing countries to meet the targets should, therefore, alongside other development interventions, be concentrated on the supply of knowledge, skills and competencies that are critical to the efficient and effective delivery of public services. A major effort is also needed in developed countries to sensitize public servants to the Goals and the principles embodied in the 2030 Agenda, which requires building skills and competencies in specific areas.

82. Irrespective of country context and the level of civil service in which civil servants serve, on the basis of the frameworks presented, the establishment of leadership capability remains a fundamental pillar of any efforts aimed at improving the capacity of civil services to deliver results. Governments that are committed to the timely and cost-effective realization of the Sustainable Development Goals may therefore need to enhance the focus on civil service leadership and management capability development.

83. Future capacity-building for civil servants at the policymaking level, especially among the least developed countries, will need to incorporate an appreciation for both the impacts and new applications of new technologies, including data analytics, artificial intelligence and biometrics. For results, the acquisition of skills and competencies for new technologies and service delivery approaches should be backed by commensurate public-private sector investment in supporting infrastructure.

84. The convergence of new skills, competencies and technologies, such as in robotics, artificial intelligence, autonomous automobiles, the Internet of things, genomic medicine, biometrics, behavioural insights and data science, holds the greatest promise for the cost-effective attainment of Sustainable Development Goal targets cutting across most of the 17 Goals. For the least developed countries, the uptake of those technologies could provide a giant forward leap towards sustainable development.

85. Differences in government-level appreciation and use of data and evidence are pronounced between developed and developing countries. In much of Africa, as well as among the developing countries of Asia and Latin America and the Caribbean, government programmes tend to be based on welfare concerns, shifting policy objectives and at times evidence from elsewhere. State investment in research and development is given insufficient priority, leading to underfunding, a situation which partly explains and, in turn, is explained by the underdevelopment in those regions.

86. Data and analytics are widely used in policy design and consequent outcomes in the developed countries, yet there is little emphasis on the value of data and evidence for public policy in many developing countries. To make the leap, civil servants in developing countries should be prepared to take the lead in translating the best industry practices in the use of data analytics and digital technologies for public service delivery improvements.